CITY TREES

IRVING C. ROOT, CHARLES C. ROBINSON

We rate a tree in a forest as potential lumber according to the texture of its wood and clean bole, its rapidity of growth, market value, and availability. City trees have price tags on them, of course (perhaps as much as $20 per inch of trunk diameter), but we appraise them largely on intangible values of shade and beauty. We judge the city tree by the shape of its canopy, its habit of growing tall and slender or small and spreading, its spring bloom or fall color, the shape and size of its leaves, and its evergreen or deciduous nature. Important, too, is whether it has any tendency to break in storms, whether it is a clean tree or a dirty one, its susceptibility to insect pests and disease, and its ability to adapt itself to the artificial conditions of cities.

No single item distinguishes a city more than its green areas, and probably our first reaction to a community is to its abundance or lack of trees. The shade they give from the sun makes the summer heat more tolerable, and filters for grateful eyes the dazzling reflection from masonry and concrete. A city of monumental buildings, like Washington, particularly needs trees to interrupt the reflected light. The landscape architect uses trees to soften hard building lines and accentuate vertical or horizontal details.

The home owner plants trees to give scale and proportion to desired features and to delight his family and neighbors with spring bloom and fragrance, green coolness in summer, color in autumn, and interesting branch-and-twig patterns in winter.

Trees form vistas, frame views, and define park areas. They can screen out undesirable sights, and separate active from passive recreation. They border our city lakes and streams and cast their reflections in our pools. Groups of trees are a back drop, a cyclorama.

For all their beauty, city trees are no weaklings. It is sometimes surprising how they can survive the artificial and adverse conditions under which they grow. Smoke and gases, physical injuries, the disrupted water table, hard-packed soil, lack of humus renewal and mulch, inadequate root space, reflected heat from pavements and buildings, and glacial blasts of air through the wind tunnel formed by street and buildings, all make their lot hard.

Because trees manufacture their food by the action of sunlight on elements in the leaf, any substantial accumulation of soot or residual oil from the air will screen out sunlight and retard this process of photosynthesis, resulting in a weakening of the tree from starvation. Trees such as ailanthus, horsechestnut, hackberry, American ash, ginkgo, poplars, sycamores, willows, lindens, and elms are all tolerant of soot and smoke. Others, like the sugar maple, sourgum, sweetgum, and honeylocust, can grow well only if the air is unpolluted.

No one seems prepared to say why one tree and not another can stand smoke and soot. It may be related to the effect of smoke and soot-impregnated soil on the mycorrhiza and their relation to root growth and feeding. Why some trees are more affected than others might be a fertile field for research. Perhaps investigation would show us how to grow sugar maples in smoky, soot-laden air where now they cannot survive. Perhaps some simple treatment of the soil or tree may some day make this possible.

Another factor that seems to affect the ability of a tree to withstand smoke and gases is the nature of its leaf surface. A rough, heavy, or sticky leaf will accumulate more soot and residual oil than a smooth or waxy one, and the latter is more easily cleaned off by rainfall and wind.

City trees are subject to physical in-

juries from many sources. Seldom is a sewer, drainage, or utility line put in on a tree-lined street but that some damage is done to the roots. Because the health of a tree is in direct proportion to the extent and effectiveness of its feeder roots, great care should be exercised that a minimum of damage be done to the tree roots during construction. This damage might not kill the tree, but it might so debilitate it that it would become easy prey to insects and disease.

The power and telephone companies used to expect their line-clearing crews to hack off the tops and sides of trees for line clearance. The branches exposed to the sun by the sudden removal of the protecting canopy were vulnerable to sunscald, which cracked the tender bark and permitted the inroads of disease and insect pests. Fortunately such butchering is on the wane, and few cities permit it today. More and more underground conduits are used; they eliminate unsightly poles and wires and do away with the necessity for any type of drastic tree pruning. Many trees are killed annually by illuminating gas from underground gas lines. One should be suspicious of chlorosis or yellowing of leaves and of any other signs of the unexplained declining health of a tree when it is located near an underground gas line.

Additional hazards of city trees are the bumps and splintering from vehicular accidents, the thoughtlessness of the boy who breaks off branches and gouges with his new knife or ax, and girdling by squirrels in a small park.

A mower in the hands of a careless maintenance man can severely damage the bark and cambium layer at the base of trees; those cuts and bruises can become immediate focal points for infectious diseases like verticillium wilt and canker stain of our sycamores. Indeed, there are several instances on record where injuries by lawn mowers were responsible for the spread of canker stain and the subsequent loss of rows of fine old sycamores.

Another disadvantage under which city trees live is the lack of humus build-up provided by the decay of fallen leaves. Humus or duff, formed by decayed leaves, is nature's food for the tree and her protection for its feeding roots from the sun and drying wind. When we remove this humus or do not permit its manufacture, we are disturbing one of nature's processes for tree growth and vigor.

In large city parks like Fairmount Park in Philadelphia and Rock Creek Park in the District of Columbia, much of the total area is left naturalized and the fallen leaves are allowed to remain, decay, and form the humus that provides much of the tree's natural food and its mulch for moisture retention. Public opinion demands, however, that the small park square, the quadrangle, and parking space along the street be kept free of fallen leaves and other debris. As a practical matter, it would be almost impossible, even if desired, to allow a build-up of fallen and decaying leaves. Clogged gutters and drain pipes, fire hazard, dangerously slippery streets, to name only a few, make necessary their prompt removal along streets and in most parks.

In their natural habitat trees usually grow in soils and moisture conditions that are best suited to them. Thus (in New England, Middle Atlantic, and Midwestern States to which this discussion pertains) we find elms, pin oaks, and sweetgums in low-lying land along the streams and even in swamps. Tuliptrees seem to like the mountain valleys from which they spread to the low-lying ridges. Red and white oaks and sourgums, on the other hand, may be found on higher mountains where their roots have to go deep for water.

Too often in city planting, particularly along the streets, we put in elms, oaks, and honeylocusts, with but little regard to their preference of soil and moisture conditions. Trees that in their native environment search deeply for water are planted alongside those with shallow roots. It is a tribute to nature's adaptability that elms can thrive alongside the deep-rooted white or red oaks.

Were it not for this amazing adaptability, the selection of trees for urban use would be even more complex. It is true, though, that the nearer we can duplicate natural conditions of the soil and the water table, the better we can expect our tree to thrive.

The runoff of rainfall is high in cities—almost 100 percent from paved areas. The ground has no chance to absorb and store up the moisture for future needs; most of the rainfall, rather, is immediately carried off into gutters and drains. Trees in sizable city parks seldom suffer from lack of moisture in periods of normal rainfall, but the street tree in a narrow parking never gets a fair share of water and cannot absorb the little it receives. An oak tree gives off some 120 tons of water in only one season through its leaves—water that must be replenished from the soil—and it seems almost miraculous that our street trees survive at all. An interesting observation is that in times of drought, street trees, which are conditioned to a constant substandard amount of moisture, fare better than those accustomed to adequate rainfall.

How can these adverse conditions be improved?

First, we must see that the tree we select for planting has a sufficiently large tree pit filled with good soil to accommodate potential roots for some years to come. The hole must have natural or artificial drainage to insure against wet feet and root suffocation. The variety selected should be environmentally suited to the designated site from the standpoint of exposure, elevation, and purity of air. It should be planted where physical hazards are few. If natural moisture is lacking, particularly during periods of drought, it must be watered. If it shows signs of starvation, it must be fed with inorganic fertilizer or organics like manure, tobacco stems, sludge, or tankage.

Use determines whether a tree is desirable or undesirable for city planting. A broad-spreading, low-hanging Chinese magnolia may be ideal as a specimen in a small city park or on home grounds but impossible as a street tree. A fastigiate English oak may be perfect for a narrow street but of limited use in the large park. Individual peculiarities may make certain trees undesirable for any urban use—the female ginkgo, whose fruit has a bad odor, for example, or the silver maple, which breaks easily in wind and snow, or the boxelder, which has rapid but unsightly growth. Lombardy and Carolina poplars are out of favor because their roots fill sewer lines.

For street use, species or varieties should be avoided that are subject to disease and insect pests. Just as a contagious disease will tend to spread rapidly through a family whose members are in close contact with one another, so the Dutch elm disease, for instance, will spread rapidly through a concentrated group of city elms unless strong preventive measures are taken.

Dutch elm disease and phloem necrosis of elm and the canker stain of sycamores make unwise their widespread planting, particularly for cities.

The Dutch elm disease, disseminated principally by the elm bark beetle, has spread quite rapidly and is difficult to control. The control of the carrier by spraying and a rigorous sanitation program, involving the immediate removal and destruction of all dead and dying wood, are at present the only effective means of dealing with this serious threat to our elms. This control is difficult because of the inaccessibility to spray machines of scattered infected trees. Canker stain of sycamores seems to be carried largely by man's own activities. Bruises made by lawn mowers and particularly pruning operations seem to be the chief means by which this canker stain is spread. For districts where canker stain is established, there are several primary control measures to be taken: Remove all diseased sycamores or diseased portions of them, and avoid all unnecessary mutilation. In zone 4 (New York and Philadelphia) prune the sycamore only between December 1 and Febru-

ary 15, and avoid asphalt tree paints during that period; disinfect all pruning tools before use on healthy sycamores between February 16 and November 30. Denatured alcohol used as a dip or swab is a satisfactory disinfectant. If wound dressing is necessary, use a gilsonite-varnish paint into which 0.2 percent phenylmercury nitrate has been mixed. For districts where the disease is not established, observe these precautions: Disinfect all of the pruning equipment thoroughly before the work begins; use new paint brushes and pots.

Most of the authorities are pessimistic about our ability to check entirely the Dutch elm disease or phloem necrosis, and at the moment we can only try to isolate them and to slow down their spread. The canker stain of sycamores, while serious enough, offers greater hope of checking and perhaps even eventual eradication or isolation.

We have listed the principal epidemic tree diseases which we are fighting today, but we must be alert for others which might appear at any time and alert to diseases which are chronic now but which might become epidemic.

In planting trees on the home grounds, in the squares and circles, the parkways, and large city parks, the determination of varieties hinges on the effects desired and factors of natural elevation and exposure that the trees require. There are several signposts to guide one in making the selections for those sites.

A good street tree is one that provides shade and ornamentation, keeps within the bounds required of its growth, does not interfere with vehicular or pedestrian traffic, and stays healthy.

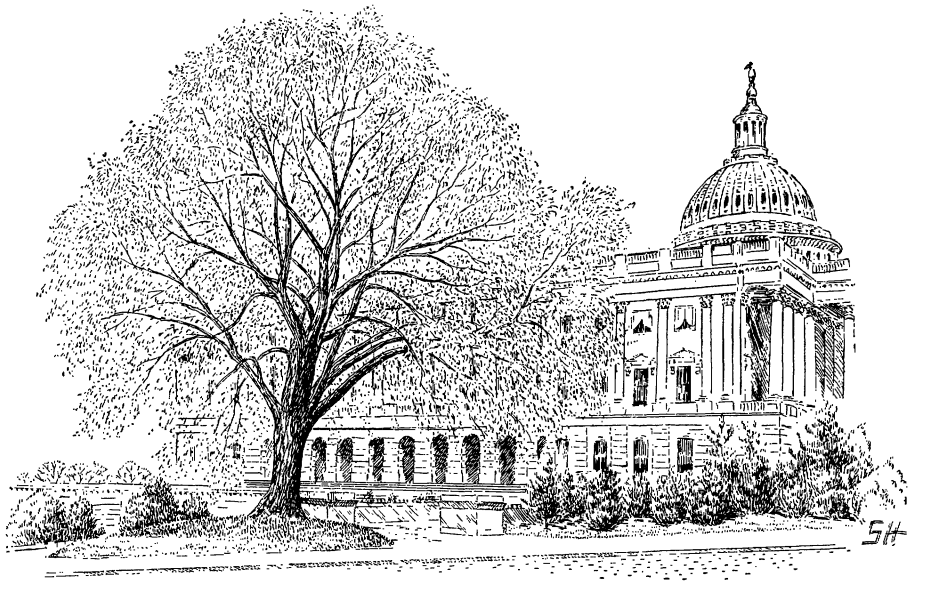
Streets of different widths require trees of different shapes and sizes. A narrow, pyramidal, or columnar tree is indicated for the narrow street with a limited building set-back; a narrow street cannot accommodate a broad specimen red oak or sycamore, but Lombardy and bolleana poplars are well adapted to this type of planting if their roots do not interfere with sewers. Those poplars are softwooded and have a tendency to break in storms, but they are sometimes useful where others cannot be grown. The pyramidal English oak, the fastigiate form of the ginkgo, as well as the pyramid tuliptree, which are tolerant of smoke and soot, are admirably suited to this use. Where polluted air is not a factor, the columnar sugar maple, the pyramidal red maple, and perhaps the sweetgum will serve the purpose, although the sweetgum is sometimes objectionable because of its falling fruit in autumn.

The wider streets can be planted to American ash, Norway maple, tuliptree, sycamore, or the lindens, all of which resist damage from smoke and fumes. Again, if smoke is not prevalent, such trees as scarlet oak, willow oak, pin oak, sugar maple, thornless honeylocust, blackgum or sourgum, and Scotch elm can be used effectively.

On the broadest avenues and boulevards there is opportunity to use large, massive tree types. Unfortunately, most of these broadheaded varieties are susceptible to the gases, smoke, and soot. The patriarch red oak, white oak, black oak, willows, and even the larger pines, spruces, and firs can be effective in the wide parking along such thoroughfares.

The limitations of space imposed by streets do not apply in our selection of trees for large city parks and parkways, institutions, or residence grounds. There we have an opportunity to plant the more common, better-known species as well as add greatly to the interest and variety of the landscape by the use of the rarer and more unusual sorts.

Many trees of outstanding beauty are too sparingly used simply because one does not know them. Pink and white dogwoods are unsurpassed of their sort, but how many people know and use the Chinese and the Kousa dogwood, whose blooms come after the foliage has appeared? Most of us know the redbud, or Judas-tree, but how many are familiar with the beautiful white form of this spring bloomer?



"A city of monumental buildings, like Washington, particularly needs trees . . ."

Magnolia soulangeana, the saucer magnolia, gets the spotlight, but the equally deserving star magnolia, *M. stellata,* and some of the *soulangeana* varieties remain relatively obscure. There is an encouraging trend toward the planting of more varieties of Japanese cherries, but several of the finest, Akebono, Mt. Fuji, and rosea, are still seldom seen. Among the flowering crab apples, *sargenti, theifera,* and Oekonomierat Echtermeyer are a few that deserve wider recognition.

Yellow is a relatively rare color among our flowering trees, and the yellow-blooming things, such as cornelian-cherry, goldenchain, and goldenrain-tree, can show up beautifully against a foil of green.

A number of other flowering trees, too little used, deserve mention: The red horsechestnut, *Aesculus carnea;* the fringetree, *Chionanthus virginica;* snowball, *Styrax japonica;* the silverbells, *Halesia tetraptera* and *monticola;* and various hawthorns, *Crataegus cordata, punctata, oxyacantha* and its varieties.

These flowering trees can be planted as single specimens, in groups, or in great drifts to enrich park and parkway plantings and add greatly to the interest of home grounds.

Chinese scholartree, *Sophora japonica,* and the zelkova are examples of outstanding shade trees that are little used. Both of these shade trees have the reputation of being trouble-free and long-lived. The scholartree gives additional dividends in its long white bloom panicles in August. The Kentucky coffeetree, too, offers great possibilities for more extensive use.

Most of us can visualize the spruces, firs, and pines at maturity, but not many, perhaps, think of the little conical sheared cypress or cedar, bought from the nurseryman, in terms of its ultimate magnificence in size and contour. Groups or specimens of Deodar cedar, cryptomeria, baldcypress, Lawson cypress, and umbrella-pine acquire character as they grow, and only when these less common trees have a chance to develop naturally do they attain their full picturesqueness.

City officials can do much to foster the propagation and development of good city tree types—for example, the pyramidal type of tuliptree, the py-

ramidal English oak, the columnar sugar maple, and the vegetatively propagated male ginkgo tree. Until cities all over the country, by their purchases, encourage the propagation of these and other desirable but little-used varieties, the growers will be forced by hard economics to confine their efforts to the more common and, in many cases, less desirable kinds.

In summary, several fundamentals are to be borne in mind if our cities are to have good trees.

First: Hire a competent landscape architect or arborist, one who knows the esthetic and practical problems of city tree planting. He is the key man in a successful program: He knows what varieties will or will not grow in any given location, how they will look at maturity, how far apart to plant the trees, and what soils will sustain them. He will use tree forms to create the desired effect.

Second: Select only those varieties adapted to your local conditions.

Third: Buy only the best obtainable materials; cheap, substandard trees are usually expensive in the end.

Fourth: Insist on proper planting to rigid specifications under the supervision of a competent plantsman.

Fifth: Spray, feed, water, and prune whenever necessary; perform these operations according to the latest scientific methods. Adequate maintenance is vital to the continuing survival and good health of trees and is as necessary as good original design and planting.

Sixth: Keep in sight the goal—beauty and livability. A city of trees is a better place in which to live.

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SHADE TREES FOR THE NORTHEAST

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Throughout the Northeastern States, the maples, the elms, and the oaks have long been preferred for shade trees. The elms in this region, however, are threatened by two serious diseases. In the northwestern part a wilt disease impairs the value of red oaks for shade-tree planting. Fortunately, there are still many kinds of beautiful native trees and some introduced kinds that make satisfactory shade trees.

Some of the outstanding deciduous shade trees that can be recommended for residential and suburban sections, primarily because of their tolerance of city conditions, are: Sugar maple, Norway maple, red maple, white oak, pin oak, northern red oak, scarlet oak, Texas oak or Shumard oak, thornless common honeylocust, sweetgum, ginkgo, American sycamore, London planetree, common hackberry, black tupelo, green ash, silver linden, littleleaf linden, Kentucky coffeetree, yellow-poplar or tuliptree, the American yellowwood, Japanese pagodatree, and Amur corktree.

In heavily congested and industrial areas the following species may be used: The ginkgo, the thornless common honeylocust, London planetree, ailanthus or tree-of-Heaven, and the Amur corktree.

In the Northeastern States, a large